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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,761	03/04/2004	Katsuyoshi Suzuki	501.43575X00	5271

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EXAMINER

RUTZ, JARED IAN

ART UNIT PAPER NUMBER

2187

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/791,761

Applicant(s)

SUZUKI ET AL.

Examiner

Jared I. Rutz

Art Unit

2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9-15, 19, and 20 is/are rejected.
- 7) ☒ Claim(s) 6-8 and 16-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 972005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

BT

DETAILED ACTION

Claims 1-20, as originally presented on 3/4/2004 are pending in the instant application.

Of these, there are 3 independent claims and 17 dependent claims.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 3/4/2004 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.
3. The information disclosure statement (IDS) submitted on 4/1/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.
4. The information disclosure statement (IDS) submitted on 5/10/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.
5. The information disclosure statement (IDS) submitted on 6/29/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims **1, 2, 4, 5, 9 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeke et al (US 6,809,505) in view of Nguyen et al (US 2003/0018756).

8. With respect to **claim 1**, Peeke teaches:

- a. A disk array device comprising: a disk array device housing. See column 3 lines 10-12.
- b. Plural disk device housings which are stored in the disk array device housing and incorporate plural disk devices. See column 3 lines 10-12, and column 3 lines 18-20 which show that each enclosure in the storage system has a plurality of disk modules.
- c. And a controller housing which is stored in the disk array device housing and incorporates a controller for controlling reading and writing of data with respect to the disk devices, See column 3 lines 47-51, which teaches a host processor enclosure having storage processors that use the data storage system.

- d. Wherein the respective disk device housings have plural connectors for connecting cables for fiber channels. See column 3 lines 36-39, which shows that each LLC 208 and 208', of which each enclosure has two, has two connection ports. Column 4 lines 45-48 teach that the connections may be fiber channels.
9. Although Peeke does teach the use of LEDs to indicate problems with connections among the disk array devices, it does not expressly disclose that there are LEDs corresponding to each connection.
10. With respect to **claim 1**, Nguyen teaches:
- e. And plural lighting units corresponding to the respective connectors. Paragraph 0034 lines 6-11 show the use of LEDs associated with the communication ports.
 - f. And the controller controls lighting states of the lighting units in accordance with a connection order of the cables. Paragraph 0034 lines 1-6 show that the program of instructions (shown in paragraph 0032 to be executed by a processor in the controller) can provide cable connection aid. Paragraph 0044 lines 1-6 show that the connection aid may be to illuminate the LEDs associated with the ports that need to be connected, which is a connection order.
11. Peeke and Nguyen are analogous art because they both deal with the same field of endeavor, making connections among storage components in fiber channel storage network environments.

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12. At the time of the invention it would have been obvious to one of ordinary skill in the art to use the cable connection aid technique of Nguyen in a storage system such as that taught by Peeke.

13. The motivation for doing so would have been to make it easier to connect the cabling of storage devices properly (Nguyen paragraph 0031, Peeke column 1 lines 7-9).

14. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Peeke and Nguyen, to use the cable connection aid of Nguyen to make it easier and more foolproof to connect the cabling in a storage system as taught by Peeke to obtain the invention as specified in **claims 1-5, 9 and 10**.

15. **Claim 2** is taught by Nguyen as:

g. A disk array device according to claim 1, wherein the respective lighting units are provided in a fixed relative positional relation with respect to the respect connectors. Figure 4 clearly shows the LEDs (items 64) in a consistent fixed relative position to their corresponding connectors (items 58_n and 61_n).

16. **Claim 3** is taught by Peeke as:

h. A disk array device according to claim 1, wherein the controller housing and the plural disk device housings are connected to a LAN cable, respectively, and the controller performs control of the lighting units via the LAN cable.

Column 3 lines 52-60 show that the storage system communicates over a plurality of backend networks. Line 60 shows that token ring and Ethernet, both

of which can form a LAN, are suitable topologies for the backend network. Lines 55-57 show that commands and messages are exchanged using the backend networks. The controlling of the lights would require sending messages over a backend network from the controller to the storage devices having the ports that need to be connected.

17. **Claim 4** is taught by Peeke as:

i. A disk array device according to claim 1, wherein the controller performs control of the lighting units via the cables which have already been connected. Column 5 lines 45-54 show that a message is sent over the communications port associated with the fiber channel over connections that are already made.

18. **Claim 5** is taught by Nguyen as:

j. A disk array device according to claim 1, wherein the controller reads a connection information file defining the connection order from a predetermined external apparatus and performs the control on the basis of the connection information file. Paragraph 0036 shows that a dial is used to inform the controller of the configuration that is desired for the storage system. The dial setting designates the connection configuration, and that connection information is data that indicates the configuration. As the dial setting provides data, it is providing the equivalent of a file from a predetermined external (to the processor) apparatus.

19. **Claim 9** is taught by Peeke as:

k. A disk array device according to claim 1, wherein the controller is capable of detecting abnormality of a connection state of connectors which are connected in accordance with the connection order. See column 4 line to column 5 line 2, which shows that the devices can detect an improper cable connection using data sent from the controller.

20. **Claim 10** is taught by Peeke as:

l. A disk array device according to claim 1, wherein the controller is provided in a plural form, the respective connectors are associated to be connected to any one of the controllers, and the respective controllers perform control of the lighting state individually. Two of the storage systems as taught by Peeke would provide plural controllers, with the connectors connected to one of the controllers, and the respective controllers performing control of the lighting state individually. It is well known to one of ordinary skill in the art that if one computer system is possible, two of them is also possible.

21. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Peeke et al (US 6,809,505) in view of Nguyen et al (US 2003/0018756), and further in view of Dellacona (US 2005/0193059).

22. With respect to **claim 11**, Peeke teaches:

m. A connection support method for, in a disk array device storing a controller housing and plural disk device housings in a disk array device housing. See column 3 lines 10-12

- n. Connecting connectors, which extend over the plural disk device housings with cables for fiber channels. Column 4 lines 16-25 show the connections of cables, and lines 45-48 show that it may be a fiber channel connection.
 - o. The connection support method comprising, as steps to be executed by the controller, a lighting control step of controlling lighting states of the cables on the basis of a result of the recognition such that the disk device housings are connected in a connection state defined in advance. Column 4 line 63 to column 5 line 2 shows that improper connections are detected using signals sent by the controller, and an alarm can signal an improper connection. Column 8 lines 32-33 show that the alarm can be flashing an LED, which is controlling a lighting state. By detecting connection errors, the controller is controlling the alarm on the basis of the recognition such that the disk device housings are connected in a connection state defined in advance.
23. Peeke does not expressly disclose that the controller recognizes the disk device housings stored in the disk array device housing.
24. With respect to claim 11, Dellacona teaches:
- p. A step of recognizing the plural disk device housings stored in the disk array device housing. Paragraph 0019 lines 15-29 show that when a disk storage device is connected to or disconnected from the disk storage device array, the controller logically connects or disconnects the disk storage device.
25. Peeke and Dellacona are analogous art because they are from the same field of endeavor, the setup of storage array devices.

26. At the time of the invention it would have been obvious to one of ordinary skill in the art to use the disk storage device detection method of Dellacona in the disk array device of Peeke.

27. The motivation for doing so would have been to make the setup of the disk array device easier to setup (Dellacona: paragraph 0004 lines 1-6, Peeke: column 2 lines 10-12).

28. Therefore, it would have been obvious to combine the disk storage device detection method of Dellacona with the disk array device of Peeke for the benefit of simplifying setup to obtain the invention as specified in **claim 11**.

29. With respect to **claim 12**, Peeke and Dellacona do not expressly disclose the positioning of the lights.

30. With respect to **claim 12** Nguyen teaches:

q. A connection support method for disk array devices according to claim 11, wherein the respective lighting units are provided in a fixed relative positional relation with respect to the respective connectors. Figure 4 clearly shows the LEDs (items 64) in a consistent fixed relative position to their corresponding connectors (items 58_n and 61_n).

31. Peeke, Dellacona and Nguyen are analogous art because they deal with the same field of endeavor, the setup of storage device arrays.

32. At the time of the invention it would have been obvious to one of ordinary skill in the art to use the cable connection aid technique of Nguyen in a storage system such as that taught by Peeke and Dellacona.

33. The motivation for doing so would have been to make it easier to connect the cabling of storage devices properly (Nguyen paragraph 0031, Peeke column 1 lines 7-9).

34. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Peeke, Dellacona and Nguyen, to use the cable connection aid of Nguyen to make it easier and more foolproof to connect the cabling in a storage system as taught by Peeke and Dellacona to obtain the invention as specified in **claims 12-15 and 19**.

35. **Claim 13** is taught by Peeke as:

r. A connection support method for disk array devices according to claim 11, wherein the controller housings are connected to a LAN cable, respectively, and the controller performs control of the lighting units via the LAN cable. Column 3 lines 52-60 show that the storage system communicates over a plurality of backend networks. Line 60 shows that token ring and Ethernet, both of which can form a LAN, are suitable topologies for the backend network. Lines 55-57 show that commands and messages are exchanged using the backend networks. The controlling of the lights would require sending messages over a backend network from the controller to the storage devices having the ports that need to be connected.

36. **Claim 14** is taught by Peeke as:

s. A connection support method for disk array devices according to claim 11, wherein the controller performs control of the lighting units via the cables which

have already been connected. Column 5 lines 45-54 show that a message is sent over the communications port associated with the fiber channel over connections that are already made.

37. **Claim 15** is taught by Nguyen as:

t. A connection support method for disk array devices according to claim 11, wherein the controller reads a connection information file defining the connection order from a predetermined external apparatus and performs the control on the basis of the connection information file. Paragraph 0036 shows that a dial is used to inform the controller of the configuration that is desired for the storage system. The dial setting designates the connection configuration, and that connection information is data that indicates the configuration. As the dial setting provides data, it is providing the equivalent of a file from a predetermined external (to the processor) apparatus.

38. **Claim 19** is taught by Peeke as:

u. A connection support method for disk array devices according to claim 11, further comprising a step in which the controller detects abnormality of a connection state of connectors which are connected in accordance with the connection order. See column 4 line to column 5 line 2, which shows that the devices can detect an improper cable connection using data sent from the controller.

39. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Peeke et al (US 6,809,505) in view of Nguyen et al (US 2003/0018756), and further in view of Burton et al (US 2005/0120267).

40. With respect to **claim 20**, Peeke teaches:

v. A disk array device comprising: plural controller housings comprising: a communication control unit which is connected to a host apparatus and receives data from the host apparatus. The host processor enclosure 206 of Peeke controls the storage and retrieval of data into and from the storage devices 204. It is clear to one of ordinary skill in the art that, although not shown, the host processor controllers receive data via a second network.

w. Plural first disk drive housings comprising: plural disk drives which are connected to a first controller housing among the plural controller housings with a first fiber channel loop. Column 3 lines 10-12 show that the storage system includes multiple storage device enclosures, which are shown in column 3 lines 18-19 to contain a plurality of disk modules. Figure 2 shows the storage enclosures connected to one of the storage processors via a fiber channel loop.

x. And store data to be transferred by the plural controllers in the first controller housing. This obvious to one of ordinary skill in the art in their designation as storage devices.

y. First connectors to which the first fiber channel loop is connected. See primary communication port 216 of figure 2.

- z. And first display devices which are provided in association with the first connectors. Column 7 lines 9-17 teach a detector that contains a plurality of LEDs which are associated with the communication ports of the LCCs.
- aa. And plural second disk drive housings comprising: plural disk drives which are connected to a second controller housing among the plural controller housings with a second fiber channel loop and store data to be transferred by the plural controllers in the second controller housing. Figure 2 shows that the storage devices are alternately connected to loop 0 and loop 1.
- bb. Second connectors to which the second fiber channel loop is connected. See primary communication port 216 of figure 2. There are separate communication ports for the storage devices on loop 0 and the storage devices on loop 1.
- cc. And second display devices which are provided in association with the second connectors. Column 7 lines 9-17 teach a detector that contains a plurality of LEDs which are associated with the communication ports of the LCCs. The second storage devices also have the detectors that the first storage devices have.
- dd. Wherein the plural controller housings, the plural first disk drive housings, and the plural second disk drive housings are arranged in an identical disk array device housing. The first and second storage devices are shown to be in the same rack, and column 3 lines 16-17 show that the host processor enclosures may also included in part of the rack.

ee. The plural first disk drive housings and the plural second disk drive housings are arranged alternately in the identical disk array device housing. Shown in figure 2.

41. Peeke does not disclose the use of the controllers to illuminate the connections needing connection in the storage system.

42. With respect to **claim 20**, Nguyen teaches:

ff. The plural controllers in the first controller housing perform control, in the case in which the first fiber channel loop is connected to the plural first disk drive housings, so as to light the first display devices of the plural first disk drive housings in an order in which the first fiber channel loop should be connected to the first connectors of the plural first disk drive housings. Paragraph 0034 lines 1-6 show that the program of instructions (shown in paragraph 0032 to be executed by a processor in the controller) can provide cable connection aid. Paragraph 0044 lines 1-6 show that the connection aid may be to illuminate the LEDs associated with the ports that need to be connected, which is a connection order.

gg. And the plural controllers in the second controller housing perform control, in the case in which the second fiber channel loop is connected to the plural second disk drive housings, so as to light the second display devices of the plural second disk drive housings in an order in which the second fiber channel loop should be connected to the second connectors of the plural second disk drive housings. Paragraph 0034 lines 1-6 show that the program of instructions

(shown in paragraph 0032 to be executed by a processor in the controller) can provide cable connection aid. Paragraph 0044 lines 1-6 show that the connection aid may be to illuminate the LEDs associated with the ports that need to be connected, which is a connection order.

43. Peeke and Nguyen are analogous art because they both deal with the same field of endeavor, making connections among storage components in fiber channel storage network environments.

44. At the time of the invention it would have been obvious to one of ordinary skill in the art to use the cable connection aid technique of Nguyen in a storage system such as that taught by Peeke.

45. The motivation for doing so would have been to make it easier to connect the cabling of storage devices properly (Nguyen paragraph 0031, Peeke column 1 lines 7-9).

46. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Peeke and Nguyen, to use the cable connection aid of Nguyen to make it easier and more foolproof to connect the cabling in a storage system as taught by Peeke to obtain the invention as specified in claim 20.

47. Neither Peeke nor Nguyen expressly teach the controller having a cache for storing data exchanged between the communication control unit and the host apparatus.

48. With respect to **claim 20**, Burton teaches:

hh. A cache memory which is connected to the communication control unit and saves data exchanged between the communication control unit and the host apparatus. Paragraph 0037 lines 9-10 teach the use of a cache and a data buffer in a storage system controller.

ii. And plural controllers which are connected to the host apparatus and the cache memory and perform control such that the data, which is exchanged between the communication control unit and the host apparatus, is transferred to the communication control unit or received from the communication control unit.

See the dual storage system controllers 112 in figure 1.

49. Peeke, Nguyen, and Burton are analogous art because they are from the same field of endeavor, the design of data storage systems having multiple storage devices.

50. At the time of the invention it would have been obvious to one of ordinary skill in the art to include a data cache as shown by Barton in the host storage controller as taught by Peeke.

51. The motivation for doing so would have been to allow the host processor of Peeke to store the data sent to it from an external network or the storage devices while it performed the necessary processing to transmit the data to the other side. The use of cache memory for this purpose is well known to one of ordinary skill in the art.

52. Therefore it would have been obvious to one of ordinary skill in the art to include a data cache as shown by Burton in the host processor system of Peeke and Nguyen to obtain the invention as specified in claim 20.

Allowable Subject Matter

53. **Claims 6-8 and 16-18** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

54. The following is a statement of reasons for the indication of allowable subject matter:

55. **Claims 6 and 16** recites the limitation “which generates the connection information file on the basis of information specifying the number of disk device housings provided in the disk array device, the number of disk devices incorporated in the respective disk device housings, and structural specifications of a RAID.” Nguyen teaches using a dial to indicate a configuration, but does not teach or suggest an information file generating unit which takes into account the number of disk devices and the structural specifications of a RAID.

56. **Claims 7 and 17** recites the limitation “according to a combination of housing information specifying the disk device housings”. Neither Peeke nor Nguyen teach or suggest the use of housing information specifying the disk device housings.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared I. Rutz whose telephone number is (571) 272-5535. The examiner can normally be reached on M-F 8:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jared I Rutz
Examiner
Art Unit 2187

jir JIR



**CHRISTIAN CHACE
PRIMARY EXAMINER**